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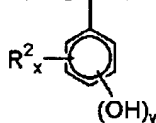
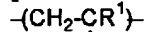
CLAIMS

[Claim(s)]

[Claim 1] (A) an acid -- unstable -- a radical -- protecting -- having had -- acidity -- a functional group -- having -- alkali -- insolubility -- or -- poor solubility -- a high molecular compound -- it is -- this -- an acid -- unstable -- a radical -- having ****ed -- the time -- alkali -- fusibility -- becoming -- a high molecular compound -- (-- B --) -- an acid generator -- (-- C --) -- one -- two - naphthoquinonediazide -- a sulfonyl group -- a molecule -- inside -- having -- a compound -- containing -- things -- the description -- ** -- carrying out -- wavelength -- 300 -- nm -- more than -- ultraviolet rays -- exposure -- the light source -- ** -- carrying out -- a resist -- an ingredient .

[Claim 2] (A) The resist ingredient according to claim 1 which the partial permutation of some hydrogen atoms of the phenolic hydroxyl group of a high molecular compound which has the repeat unit the high molecular compound of a component is indicate to are by the following general formula (1) is carry out by one sort or two sorts or more of acid unstable radicals, and an acid unstable radical exceeds an average of zero-mol% of the whole hydrogen atom of the phenolic hydroxyl group of a formula (1), and is characterize by be the weight average molecular weight 3,000-300,000 which is a rate not more than 80 mol %.

[Formula 1]



(1)

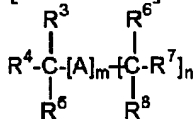
(R1 shows a hydrogen atom or a methyl group among a formula, and R2 shows the shape of a straight chain, the shape of branching, and the annular alkyl group of carbon numbers 1-8.) Moreover, 0 or a positive integer, and y are positive integers, and x is a number with which are satisfied of $x+y \leq 5$.

[Claim 3] (B) The resist ingredient according to claim 1 or 2 with which the acid generator of a component is characterized by being an oxime sulfonate compound.

[Claim 4] Furthermore, claim 1 characterized by including (D) basicity compound thru/or the resist ingredient of 3 given in any 1 term.

[Claim 5] Furthermore, claim 1 characterized by including the low nuclide shown by the following general formula (2) whose ratios of the number of phenolic hydroxyl groups and the number of the benzene rings it has a phenolic hydroxyl group, the number of the benzene rings is 2-20 as a (E) dissolution accelerator, and are 0.5-2.5 thru/or the resist ingredient of 4 given in any 1 term.

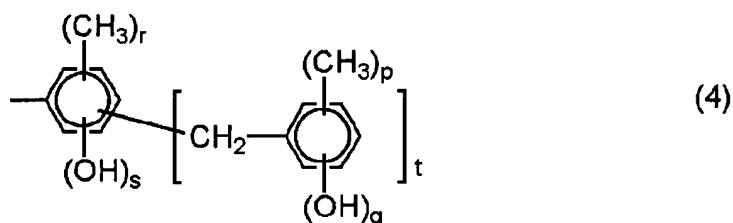
[Formula 2]



(R3-R8 are radicals shown independently by the hydrogen atom, the methyl group, the radical shown by the following formula (3), or the following formula (4), respectively among a formula.) m is the integer of 0-2, n is the integer of 0-2, and when n is 0, m is 1 or 2. A -- n -- 0 -- and the radical shown by the hydrogen atom, the methyl group, or the following formula (3) when m is 1 -- it is -- n -- 0 -- and when the radical and n another side is indicated to be by the

hydrogen atom, the methyl group, or the following formula (3) by the radical one side is indicated to be by the methylene group or the following formula (5) when m is 2 are 1, it is the radical shown by the methylene group or the following formula (5). When n is 2, and the radical and m A is indicated to be by the methine group or the following formula (6) when m is 1 are 2, it is the radical another side is indicated to be by the methine group or the following formula (6) by the radical one side of A is indicated to be by the methylene group or the following formula (5).

[Formula 3]



(Among a formula, although p, q, r, s, t, u, and v are the integers of 0-3, respectively, it is $p+q \leq 5$, $r+s \leq 4$, and $u+v \leq 3$.)

[Claim 6] (i) The pattern formation approach which (ii) Ranks second with the process which applies a resist ingredient given in claim 1 thru/or any 1 term of 5 on a substrate, and is characterized by including the process exposed by ultraviolet rays 300nm or more after heat-treatment and through a photo mask, and the process developed using a developer after heat-treating if needed (iii).

[Claim 7] The pattern formation approach according to claim 6 that the thickness of the resist film which applied the resist ingredient to the substrate and formed it is 3-50 micrometers.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the resist ingredient and the pattern formation approach of giving high resolution by high sensitivity by ultraviolet-rays (300nm or more) exposure.

[0002]

[Description of the Prior Art] As resist film of the thick-film type (3-50 micrometers) used on a substrate for the circuit pattern formation by plating, the good high pattern profile of rectangle nature and high plating-proof nature are called for. Conventionally, as a resist-patterning method for this purpose, a novolak type resist ingredient is used and the technique of forming a resist pattern with the aligner which makes g line and i line the light source is used widely. However, low sensibility is formed according to increase of the light absorption of the resist film resulting from a high thick film, and the throughput fall at the time of the mass production accompanying it is a problem.

[0003] Moreover, a limitation essential to definition and a pattern configuration came to be seen by absorption of the above-mentioned resist film also to the raise in resolving demanded with detailed-izing of a circuit pattern in recent years.

[0004] Furthermore, with a novolak type resist ingredient, in patterning, skirt length is often seen on the base of plating, and this becomes the cause which produces fault in formation of plating after resist pattern formation. For this reason, the resist ingredient of the high thick-film type (3-50 micrometers) it has a type and plating-proof [quantity] nature by the high resolution in which patterning is possible, and high sensitivity with the aligner which makes the light source ultraviolet rays, such as g line used widely and i line, is called for.

[0005] This invention is what met the above-mentioned request of the conventional technique, and aims at offering the resist ingredient and the pattern formation approach of having the high resolution suitable for detailed plating circuit pattern formation, and high sensitivity.

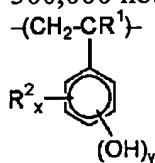
[0006]

[The means for solving a technical problem and the gestalt of implementation of invention] It is the alkali insoluble or poorly soluble high molecular compound which has the acid functional group protected by (A) acid unstable radical as a result of inquiring wholeheartedly, in order that this invention person may attain the above-mentioned purpose. The high molecular compound which serves as alkali fusibility when this acid unstable radical ****s, (B) (D) basicity compound and the resist ingredient which comes to contain (E) dissolution accelerator by ultraviolet-rays exposure the compound which has acid generator, 1, and 2-naphthoquinonediazide sulfonyl group in a molecule, and if needed by high resolution and high sensitivity It found out that the good high pattern configuration and the high resolution of that an improvement effect is in the skirt length on a NiFe film substrate especially and perpendicularity were obtained.

[0007] It is the high resolution and high sensitivity which were excellent even if especially this resist ingredient was effective as a high thick-film type thing and having been formed in 3-50-micrometer thickness, and adhesion has good plating-proof [quantity] nature. Namely, the pattern formation in high density is called for and, as for the circuit pattern by plating for which the resist ingredient of this invention is used, circuit pattern formation of high density is advanced by narrow line width-ization of a resist pattern to this demand in recent years. And although formation by resist ingredient nearby thickness was called for since thick-film-ization also had to be advanced to coincidence in order to secure the capacity of wiring accompanying this narrow-line-width-izing, and it corresponded to thick-film-ization of this plating wiring, the knowledge of being suitable for the demand which requires the resist ingredient of

this invention is carried out, and it came to make this invention.

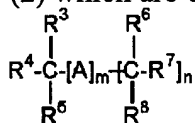
[0008] Therefore, this invention is an alkali insoluble or poorly soluble high molecular compound which has the acid functional group protected by [I] (A) acid unstable radical. The high molecular compound which serves as alkali fusibility when this acid unstable radical ****s, (B) An acid generator, 1, the resist ingredient that makes ultraviolet rays with a wavelength of 300nm or more characterized by containing the compound which has 2-naphthoquinonediazide sulfonyl group in a molecule the exposure light source, The partial permutation of some hydrogen atoms of the phenolic hydroxyl group of a high molecular compound which has the repeat unit the high molecular compound of the [II (A)] component is indicated to be by the following general formula (1) is carried out by one sort or two sorts or more of acid unstable radicals. The resist ingredient given in [I] with which an average of zero-mol% of the whole hydrogen atom of the phenolic hydroxyl group of a formula (1) is exceeded, it comes out comparatively and an acid unstable radical is characterized by being a certain weight average molecular weight 3,000-300,000 not more than 80 mol %, [Formula 4]



(1)

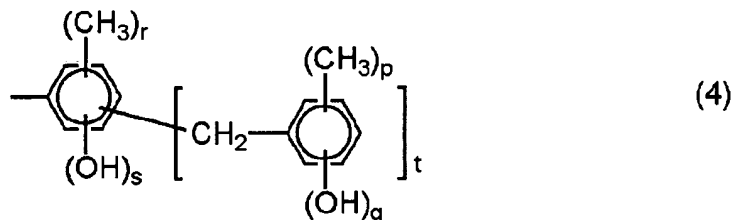
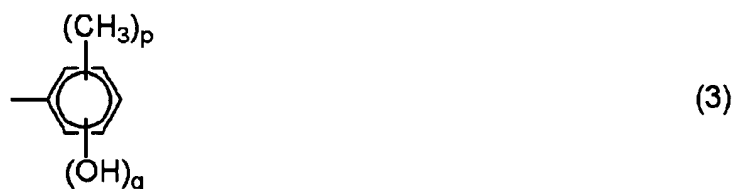
(R1 shows a hydrogen atom or a methyl group among a formula, and R2 shows the shape of a straight chain, the shape of branching, and the annular alkyl group of carbon numbers 1-8.) Moreover, 0 or a positive integer, and y are positive integers, and x is a number with which are satisfied of $x+y \leq 5$.

[I] to which the acid generator of the [III (B)] component is characterized by being an oxime sulfonate compound, or a resist ingredient given in [II], [IV] as the resist ingredient of [I] further characterized by including (D) basicity compound thru/or [III] given in any 1 term, [V], and also a (E) dissolution accelerator It has a phenolic hydroxyl group and the number of the benzene rings is 2-20. And [I] characterized by including the low nuclide the ratio of the number of phenolic hydroxyl groups and the number of the benzene rings is indicated to be by the following general formula (2) which are 0.5-2.5 thru/or the resist ingredient of [IV] given in any 1 term, [Formula 5]



(2)

(R3-R8 are radicals shown independently by the hydrogen atom, the methyl group, the radical shown by the following formula (3), or the following formula (4), respectively among a formula.) m is the integer of 0-2, n is the integer of 0-2, and when n is 0, m is 1 or 2. A -- n -- 0 -- and the radical shown by the hydrogen atom, the methyl group, or the following formula (3) when m is 1 -- it is -- n -- 0 -- and when the radical and n another side is indicated to be by the hydrogen atom, the methyl group, or the following formula (3) by the radical one side is indicated to be by the methylene group or the following formula (5) when m is 2 are 1, it is the radical shown by the methylene group or the following formula (5). When n is 2, and the radical and m A is indicated to be by the methine group or the following formula (6) when m is 1 are 2, it is the radical another side is indicated to be by the methine group or the following formula (6) by the radical one side of A is indicated to be by the methylene group or the following formula (5). [Formula 6]



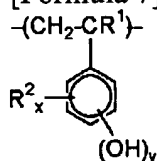
(Among a formula, although p, q, r, s, t, u, and v are the integers of 0-3, respectively, it is $p+q \leq 5$, $r+s \leq 4$, and $u+v \leq 3$.)

(ii) [VI] ii Rank second with the process which applies a resist ingredient (i) [I] thru/or given in any 1 term of [V] on a substrate. The process exposed by ultraviolet rays 300nm or more through a photo mask after heat-treatment, (iii) After heat-treating if needed, the thickness of the pattern formation approach characterized by including the process developed using a developer and the resist film which applied the [VII] resist ingredient to the substrate and formed it offers the pattern formation approach given in 3 - [VI] which is 50 micrometers.

[0009] Hereafter, it explains per this invention and also to a detail. The high molecular compound of the (A) component of this invention is an alkali insoluble or poorly soluble high molecular compound which has the acid functional group protected by the acid unstable radical. It is the high molecular compound which serves as alkali fusibility when this acid unstable radical ****s. For example, the partial permutation of some hydrogen atoms of the phenolic hydroxyl group of a high molecular compound which has the repeat unit shown by the following general formula (1) is carried out by one sort or two sorts or more of acid unstable radicals. an acid unstable radical -- an average of zero-mol% of the whole hydrogen atom of the phenolic hydroxyl group of a formula (1) -- exceeding -- less than [80 mol %] -- desirable -- 10 - 50-mol % -- comparatively -- coming out -- a certain weight average molecular weight 3,000-300,000 -- the high molecular compound of 3,000-30,000 is used preferably.

[0010]

[Formula 7]



[0011] Here, R1 shows a hydrogen atom or a methyl group, and R2 shows the shape of a straight chain, the shape of branching, and the annular alkyl group of carbon numbers 1-8. Moreover, 0 or a positive integer, and y are positive integers, and x is a number with which are satisfied of $x+y \leq 5$.

[0012] As an acid unstable radical, although many things are selected, it is desirable that they are the radical especially shown by the following general formula (7) and (8), a tert-alkyl group, a trialkylsilyl group, a keto alkyl group, etc.

[0013]

[Formula 8]



[0014] Here, R9 and R10 show independently the alkyl group of the shape of a hydrogen atom or the shape of a straight chain of carbon numbers 1-6, and branching, respectively, and R11 is the shape of a straight chain, the shape of branching, and the annular alkyl group of carbon numbers 1-10, or R9, R10, R9 and R11, or R10 and R11 may form a ring. When forming a ring, R9, R10, and R11 show independently the alkylene group of the shape of the shape of a straight chain of carbon numbers 1-6, and branching, respectively.

[0015] As a radical of a formula (7), specifically 1-ethoxyethyl radical, a 1-n-propoxy ethyl group, 1-isopropoxy ethyl group, a 1-n-butoxy ethyl group, a 1-iso butoxy ethyl group, A 1-sec-butoxy ethyl group, a 1-tert-butoxy ethyl group, A 1-tert-friend ROKISHI ethyl group, a 1-ethoxy-n-propyl group, An acetal radical with annular acetal radical of the shape of the shape of a straight chain, such as 1-cyclo hexyloxyethyl radical, and branching, tetrahydrofuranyl radical, etc. is mentioned, and 1-ethoxyethyl radical and a 1-ethoxy-n-propyl group are mentioned preferably.

[0016] a formula (8) -- setting -- R12 -- carbon numbers 4-12 -- desirable -- 4-8 -- the 3rd class alkyl group of 4-6 is shown still more preferably, and a is the integer of 0-6.

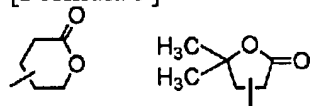
[0017] Specifically, a tert-butoxycarbonyl radical, a tert-butoxy carbonylmethyl radical, a tert-friend ROKISHI carbonyl group, a tert-friend ROKISHI carbonylmethyl radical, etc. are mentioned as a radical of a formula (8).

[0018] Moreover, as the above-mentioned tert-alkyl group, tert-butyl, a tert-amyl group, 1-methylcyclohexyl radical, etc. are mentioned.

[0019] As a trialkylsilyl group, the radical the thing of 1-6 is indicated to be for the carbon number of each alkyl group, such as a trimethylsilyl radical, a triethyl silyl radical, and a dimethyl-tert-butylsilyl radical, by the 3-oxocyclohexyl radical or the following formula as a keto alkyl group is mentioned.

[0020]

[Formula 9]



[0021] Next, as an acid generator of the (B) component, although an oxime sulfonate compound, onium salt, a beta-keto sulfone derivative, a diazomethane derivative, a disulfon derivative, a sulfonate derivative, an imido-yl-sulfonate derivative, etc. are mentioned, an oxime sulfonate compound can be used suitably.

[0022] Specifically, it is alpha as an oxime sulfonate compound. -(p-tosyl OKISHIIMINO)- Phenylacetonitrile, alpha -(p-chlorobenzene sulfonyloxy imino)- Phenylacetonitrile, alpha -(4-nitrobenzene sulfonyloxy imino)- Phenylacetonitrile, alpha -(4-nitro-2-trifluoromethyl benzene sulfonyloxy imino)- Phenylacetonitrile, An alpha-(benzene sulfonyloxy imino)-4-chlorophenyl acetonitrile, alpha-(benzene sulfonyloxy imino)-2, 4-dichlorophenyl acetonitrile, alpha-(benzene sulfonyloxy imino)-2, 6-dichlorophenyl acetonitrile, alpha-(benzene sulfonyloxy imino)-4-methoxyphenyl acetonitrile, alpha-(2-chlorobenzene sulfonyloxy imino)-4-methoxyphenyl acetonitrile, alpha-(benzene sulfonyloxy imino)-2-thienyl phenylacetonitrile, alpha -(4-dodecylbenzene sulfonyloxy imino)- Phenylacetonitrile, alpha-(4-toluenesulfonyloxy imino)-4-methoxyphenyl acetonitrile, alpha-(4-dodecylbenzene sulfonyloxy imino)-4-

methoxyphenyl acetonitrile, an alpha-(4-toluenesulfonyloxy imino)-3-thienyl acetonitrile, etc. are mentioned.

[0023] As onium salt, trifluoro methansulfonic acid diphenyliodonium, Trifluoro methansulfonic acid (p-tert-butoxy phenyl) iodonium, P-toluenesulfonic-acid diphenyliodonium, p-toluenesulfonic-acid (p-tert-butoxy phenyl) iodonium, Trifluoro methansulfonic acid triphenylsulfonium, trifluoro methansulfonic acid (p-tert-butoxy phenyl) diphenyl sulfonium, Trifluoro methansulfonic acid bis(p-tert-butoxy phenyl) phenyl sulfonium, Trifluoro methansulfonic acid tris (p-tert-butoxy phenyl) sulfonium, P-toluenesulfonic-acid triphenylsulfonium, p-toluenesulfonic-acid (p-tert-butoxy phenyl) diphenyl sulfonium, P-toluenesulfonic-acid bis(p-tert-butoxy phenyl) phenyl sulfonium, P-toluenesulfonic-acid tris (p-tert-butoxy phenyl) sulfonium, Nonafluorobutane sulfonic-acid triphenylsulfonium, butane sulfonic-acid triphenylsulfonium, Trifluoro methansulfonic acid trimethyl sulfonium, p-toluenesulfonic-acid trimethyl sulfonium, Trifluoro methansulfonic acid cyclohexyl methyl (2-oxocyclohexyl) sulfonium, P-toluenesulfonic-acid cyclohexyl methyl (2-oxocyclohexyl) sulfonium, Trifluoro methansulfonic acid dimethylphenyl sulfonium, p-toluenesulfonic-acid dimethylphenyl sulfonium, Trifluoro methansulfonic acid dicyclohexyl phenyl sulfonium, p-toluenesulfonic-acid dicyclohexyl phenyl sulfonium, etc. are mentioned.

[0024] As a beta-keto sulfone derivative, a 2-cyclohexyl carbonyl-2-(p-tosyl) propane, a 2-isopropyl carbonyl-2-(p-tosyl) propane, etc. are mentioned.

[0025] As a diazomethane derivative, bis(benzenesulphonyl) diazomethane, bis(cyclohexyl sulfonyl) diazomethane, bis (tert-butyl sulfonyl) diazomethane, etc. are mentioned.

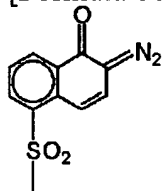
[0026] Diphenyl disulfon, dicyclohexyl disulfon, etc. as a disulfon derivative as a sulfonate derivative 1, 2, 3-tris (methane sulfonyloxy) benzene, 1 and 2, 3-tris (trifluoromethane sulfonyloxy) benzene, 1, 2, and 3-tris (p-toluenesulfonyloxy) benzene etc. as an imido-yl-sulfonate derivative Phthalimide-IRU-triflate, phthalimide-IRU-tosylate, 5-norbornene -2, 3-dicarboxyimide-IRU-triflate, 5-norbornene -2, 3-dicarboxyimide-IRU-tosylate, 5-norbornene -2, 3-dicarboxyimide-IRU-n-butyl sulfonate, etc. are mentioned.

[0027] The addition of an acid generator is the 1 - 8 section preferably the 0.5 to 15 section to the high-molecular-compound 80 section (it is the same the weight section and the following) of the (A) component. Since the definition of a resist ingredient may fall and a monomer component will become superfluous if [than the 15 sections] more [sensibility may be bad if fewer than the 0.5 sections, and], thermal resistance may fall.

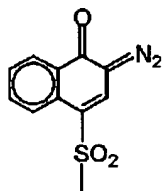
[0028] As a compound which has 1 of this invention, and 2-naphthoquinonediazide sulfonyl group in a molecule, 1 shown by the following general formula (9) or (10) and the compound which has 2-naphthoquinonediazide sulfonyl group in a molecule are mentioned.

[0029]

[Formula 10]



(9)



(10)

[0030] Specifically, 2,000-20,000, and the novolak resin that is the range of 3,000-10,000 preferably are suitably used for the weight average molecular weight which has the repeat unit shown by the ballast molecule shown by the following general formula (2) which has Tori or a tetra-hydroxy benzophenone, and a phenolic hydroxyl group, or the following formula (11) as a compound with which above, 1, and 2-naphthoquinonediazide sulfonyl group is introduced.

[0031]

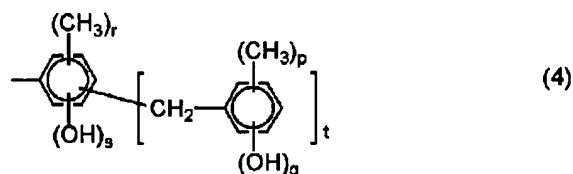
[Formula 11]



[0032] Here, R³-R⁸ are radicals shown independently by the hydrogen atom, the methyl group, the radical shown by the following formula (3), or the following formula (4), respectively. m is the integer of 0-2, n is the integer of 0-2, and when n is 0, m is 1 or 2. A -- n -- 0 -- and the radical shown by the hydrogen atom, the methyl group, or the following formula (3) when m is 1 -- it is -- n -- 0 -- and when the radical and n another side is indicated to be by the hydrogen atom, the methyl group, or the following formula (3) by the radical one side is indicated to be by the methylene group or the following formula (5) when m is 2 are 1, it is the radical shown by the methylene group or the following formula (5). When n is 2, and the radical and m A is indicated to be by the methine group or the following formula (6) when m is 1 are 2, it is the radical another side is indicated to be by the methine group or the following formula (6) by the radical one side of A is indicated to be by the methylene group or the following formula (5).

[0033]

[Formula 12]



(Among a formula, although p, q, r, s, t, u, and v are the integers of 0-3, respectively, it is p+q≤5, r+s≤4, and u+v≤3.)

[0034] in this case, the low nuclide (ballast molecule) of the above-mentioned formula (2) -- the number of the benzene rings -- 2-20 pieces -- more -- desirable -- 2-10 pieces -- further -- desirable -- 3-6 pieces -- it is -- and the ratio of the number of phenolic hydroxyl groups, and the number of the benzene rings -- 0.5-2.5 -- it is more preferably suitable 0.7-2.0, and that it is the thing of 0.8-1.5 still more preferably.

[0035]

[Formula 13]

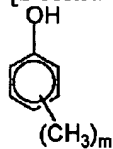


(m is the integer of 0-3 among a formula.)

[0036] The novolak resin of the above-mentioned formula (11) is compoundable the phenols shown by the following formula (12), and by specifically carrying out condensation of at least one sort of phenols and aldehydes, such as o-cresol, m-cresol, p-cresol, and 3,5-xylenol, by the usual approach.

[0037]

[Formula 14]



(12)

(m is the integer of 0-3 among a formula.)

[0038] In this case, as aldehydes, although formaldehyde, a paraformaldehyde, an acetaldehyde, a benzaldehyde, etc. are mentioned, for example, formaldehyde is suitable.

[0039] In addition, the rate of the phenols of the above-mentioned formula (12) and aldehydes has the desirable rate of 0.2-2, especially 0.3-2 at a mole ratio.

[0040] It is desirable to use the demineralization acid condensation reaction by the base catalyst of 1 and 2-naphthoquinonediazide sulfonyl chloride and a phenolic hydroxyl group as 1 to the compound with which the above 1 and 2-naphthoquinonediazide sulfonyl group are introduced, and the introductory approach of 2-naphthoquinonediazide sulfonyl group. the rate of permuting the hydrogen atom of a phenolic hydroxyl group by 1 and 2-naphthoquinonediazide sulfonyl group in the case of the ballast molecule of a formula (2), Tori, or a tetra-hydroxy benzophenone -- 10 - 100-mol % and the rate of being 50 - 100-mol % preferably, and permuting the hydrogen atom of a phenolic hydroxyl group by 1 and 2-naphthoquinonediazide sulfonyl group in the case of the novolak resin of a formula (11) -- 2 - 50-mol % -- it is preferably [3 - 27 mol% of] desirable.

[0041] The addition of the compound which has 1 and 2-naphthoquinonediazide sulfonyl group in a molecule is the 0.5 - 10 section preferably the 0.1 to 15 section to the high-molecular-compound 80 section of the (A) component. Sensibility may be bad if [than the 15 sections] more [the definition of a resist ingredient may fall if fewer than the 0.1 sections, and].

[0042] (D) The compound which can control the diffusion rate at the time of the acid generated from an acid generator being spread in the resist film as a basic compound of a component is suitable, the diffusion rate of the acid in the inside of the resist film is controlled by combination of such a basic compound, resolution improves, the sensibility change after exposure can be controlled, or a substrate and an environmental dependency can be lessened, and whenever [exposure allowances], a pattern profile, etc. can be improved.

[0043] As such a basic compound, the fatty amines of the 1st class, the 2nd class, and the 3rd class, hybrid amines, aromatic amine, heterocycle amines, the nitrogen-containing compound that has a carboxy group, the nitrogen-containing compound which has a sulfonyl group, the nitrogen-containing compound which has a hydroxy group, the nitrogen-containing compound which has a hydroxyphenyl radical, an alcoholic nitrogen-containing compound, an amide derivative, an imide derivative, etc. are mentioned.

[0044] Ammonia, monomethylamine, ethylamine, n propylamine, an isobutyl amine, a sec-butylamine, a tert-butylamine, etc. as fatty amines of the 1st class specifically as fatty amine of the 2nd class Dimethylamine, diethylamine, G n propylamine, diisopropylamine, G n butylamine, diisobutylamine, a G sec-butylamine, etc. as fatty amine of the 3rd class A trimethylamine, triethylamine, tree n propylamine, a triisopropyl amine, tree n butylamine, a TORIISO butylamine, a tree sec-butylamine, etc. are mentioned.

[0045] As hybrid amines, dimethyl ethylamine, methylethyl propylamine, benzylamine, phenethylamine, benzyl dimethylamine, etc. are mentioned, and aniline, N.N-dimethylaniline, pyridine, quinoline, 1, and 8-diazabicycloundecen etc. is mentioned as aromatic amine and heterocycle amines.

[0046] As a nitrogen-containing compound which has a carboxy group, 3-pyridine sulfonic acid, p-toluenesulfonic-acid pyridinium, etc. are mentioned as a nitrogen-containing compound in which an aminobenzoic acid, the Indore carboxylic acid, a nicotinic acid, an alanine, etc. have a sulfonyl group.

[0047] As the nitrogen-containing compound which has a hydroxy group, the nitrogen-containing compound which has a hydroxyphenyl radical, and an alcoholic nitrogen-containing compound, 2-hydroxypyridine, amino cresol, 2,4-quinoline diol, 3-Indore methanol HIDORETO, triethanolamine, N-ethyl diethanolamine, piperidine ethanol, etc. are

mentioned.

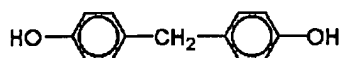
[0048] As an amide derivative, a formamide, N-methyl formamide, N,N-dimethylformamide, an acetamide, N-methyl acetamide, N,N-dimethylacetamide, a propione amide, a benzamide, etc. are mentioned, and a phthalimide, Succin imide, maleimide, etc. are mentioned as an imide derivative.

[0049] The above-mentioned basic compound is independent, or can use one sort combining two or more sorts, and what mixed the 0.01 - 1 section the zero to 2 section to the high-molecular-compound 80 section of the (A) component is suitable for especially the loadings. If loadings exceed the two sections, sensibility may fall too much.

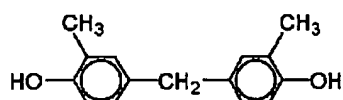
[0050] Moreover, as a dissolution accelerator of the (E) component, it has a phenolic hydroxyl group, the 2-20 number [2-10] of the benzene rings is 3-6 still more preferably more preferably, and 0.5-2.5, and the low nuclide more preferably shown by 0.7-2.0, and the general formula (2) that is the thing of 0.8-1.5 still more preferably, and that was mentioned above are mentioned for the ratio of the number of phenolic hydroxyl groups, and the number of the benzene rings. Specifically, the following are mentioned as such a low nuclide.

[0051]

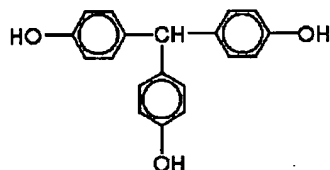
[Formula 15]
(E-1)



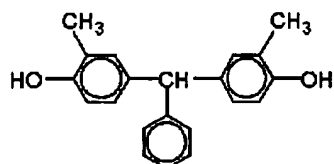
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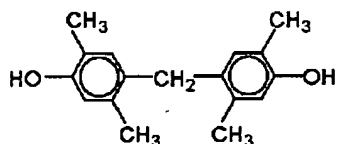
(E-3)



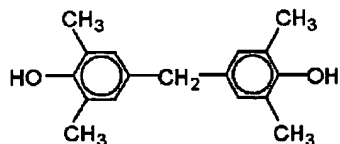
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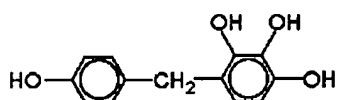
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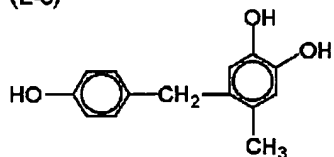
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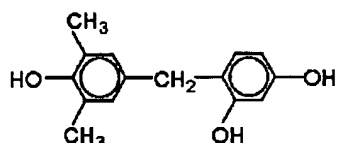
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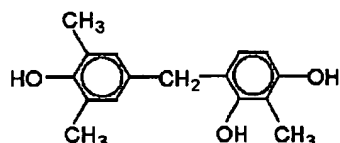
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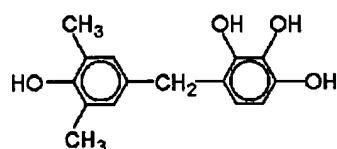
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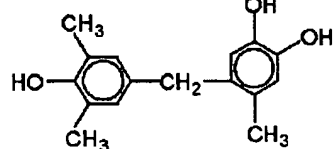
(E-10)



(E-11)



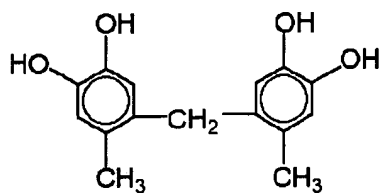
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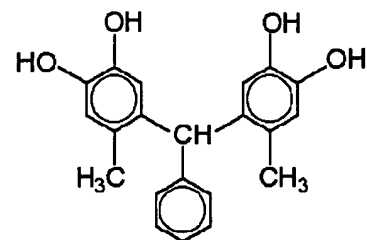
[0052]

[Formula 16]

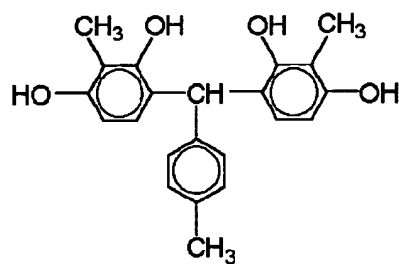
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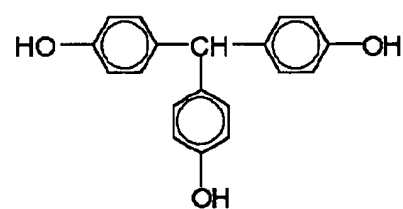
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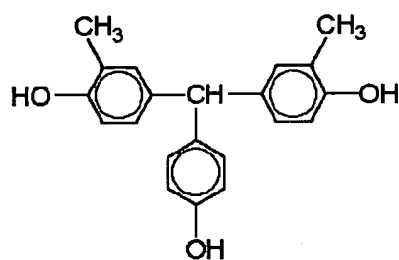
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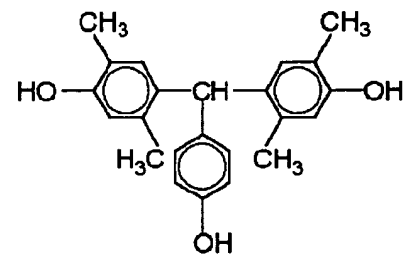
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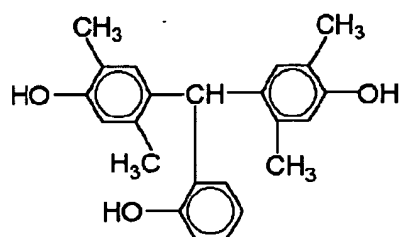
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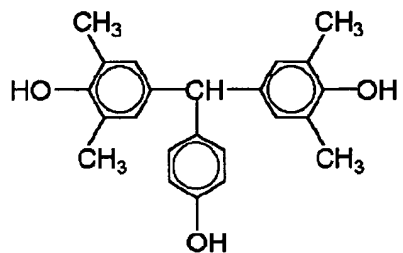
(E-18)



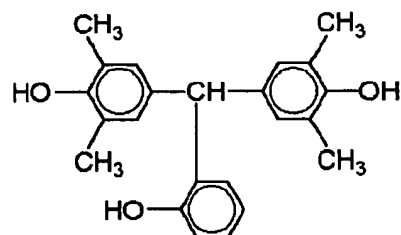
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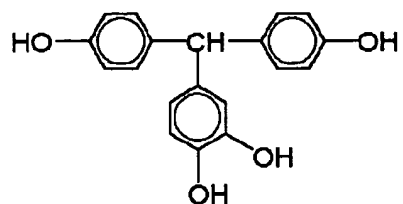
(E-20)



(E-21)



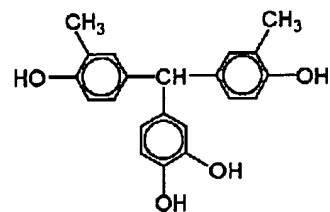
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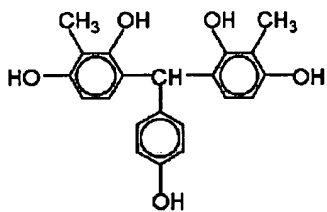
[0053]

[Formula 17]

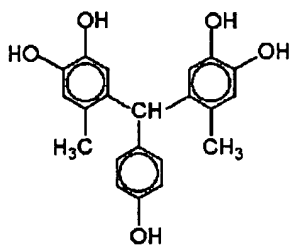
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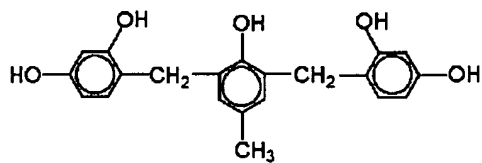
(E-24)



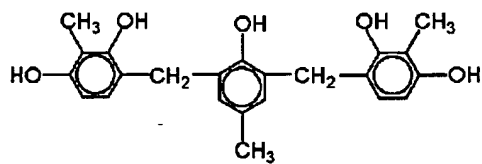
(E-25)



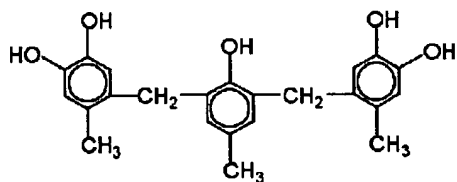
(E-26)



(E-27)



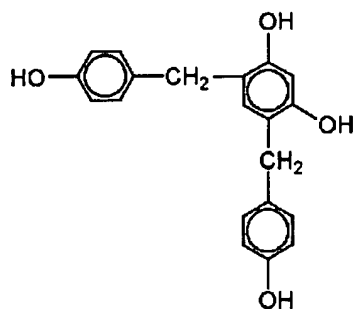
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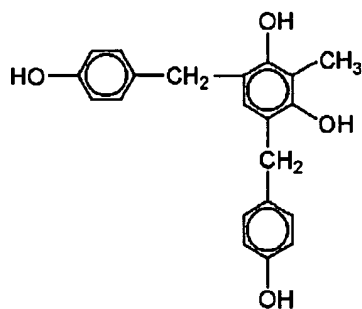
[0054]

[Formula 18]

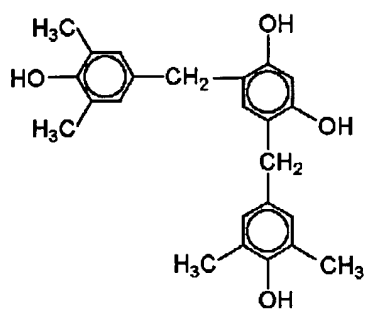
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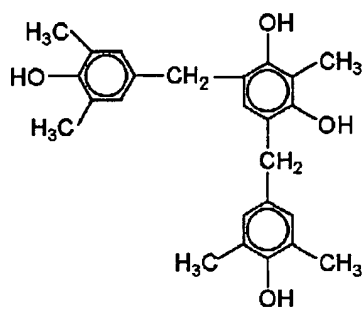
(E-30)



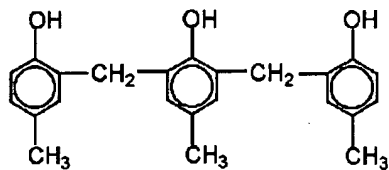
(E-31)



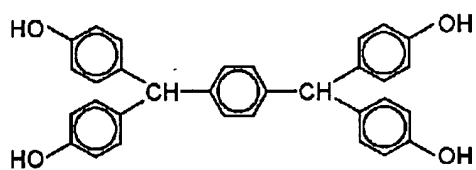
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(E-33)

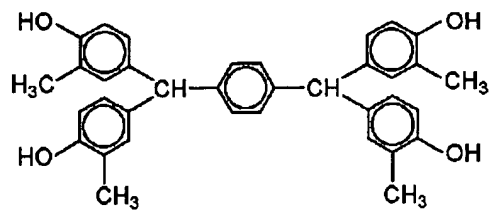


(E-34)

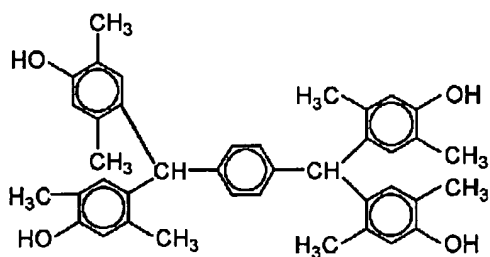


[0055]
[Formula 19]

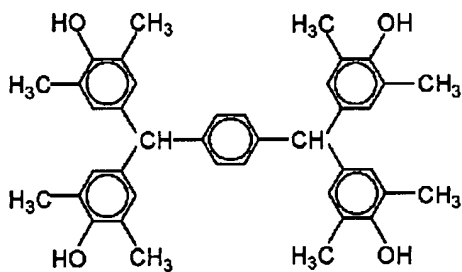
(E-35)



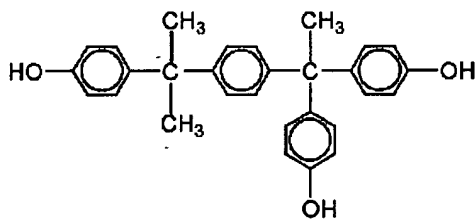
(E-36)



(E-37)



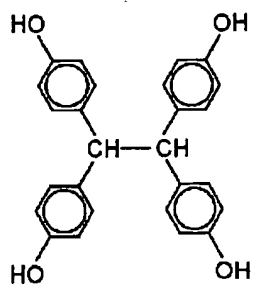
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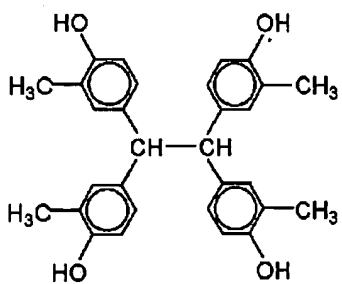
[0056]

[Formula 20]

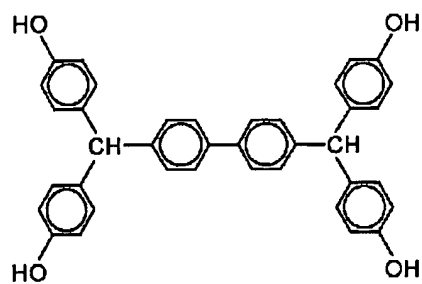
(E-39)



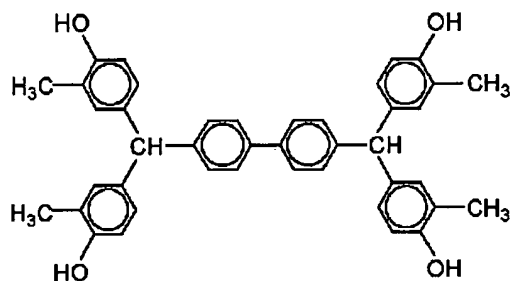
(E-40)



(E-41)



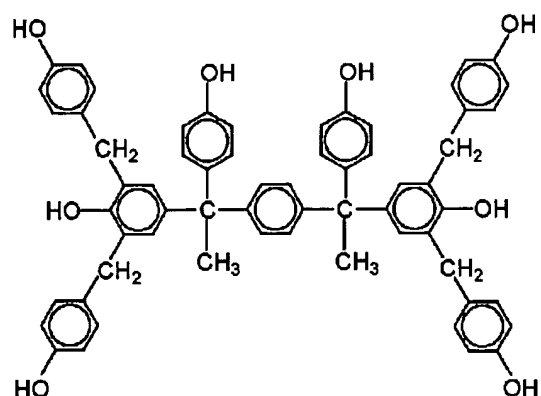
(E-42)



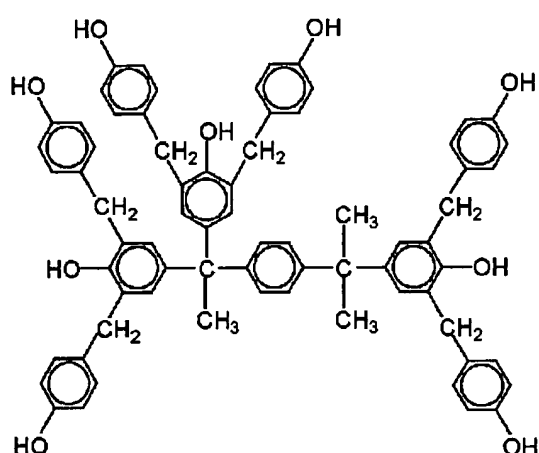
[0057]

[Formula 21]

(E-43)



(E-44)



[0058] A dissolution accelerator is independent, or one sort can be used for it combining two or more sorts, and what mixed the 0.05 - 5 section the zero to 10 section to the high-molecular-compound 80 section of the (A) component is suitable for especially the loadings. If [than the ten sections] more, definition and thermal resistance may fall.

[0059] As an organic solvent, a cyclohexanone, 2-heptanone, 3-heptanone, Ketones, such as 4-heptanone, 3-methoxybutanol, 3-methyl-3-methoxybutanol, Alcohols, such as 1-methoxy-2-propanol and 1-ethoxy-2-propanol, Propylene glycol monomethyl ether, ethylene glycol monomethyl ether, The propylene glycol monoethyl ether, propylene glycol wood ether, Diethylene-glycol wood ether, ethylene glycol-tert-butyl ether methyl ether (1-tert-butoxy-2-methoxyethane), Ether, such as ethylene glycol-tert-butyl ether ethyl ether (1-tert-butoxy-2-ethoxy ethane), Propylene-glycol-monomethyl-ether acetate, propylene glycol monoethyl ether acetate, Ester, such as ethyl lactate, pyruvic-acid ethyl, butyl acetate, methyl-3-methoxy propionate, ethyl-3-ethoxy propionate, acetic-acid tert-butyl, propionic-acid tert-butyl, and beta-methoxy isobutyric-acid methyl, is mentioned. In these, propylene-glycol-monomethyl-ether acetate (alpha mold, beta mold) excellent in the solubility of 1-ethoxy-2-propanol excellent in the solubility of a resist component or a resist component and safety is used preferably. In addition, the above-mentioned organic solvent is independent, or can use one sort combining two or more sorts.

[0060] The addition of an organic solvent has the 90 - 600 desirable section to the high-molecular-compound 80 section of the (A) component, and is the 100 - 500 section more preferably.

[0061] Into the resist ingredient of this invention, the extinction nature ingredient for lessening scattered reflection from a surfactant and a substrate commonly used in order to raise spreading nature as an arbitration component in addition to the above-mentioned component can be added. In addition, the addition of an arbitration component can usually be made into an amount in the range which does not bar the effectiveness of this invention.

[0062] As a surfactant, a nonionic thing is desirable and perfluoroalkyl polyoxyethylene ethanol, fluorination alkyl ester, a perfluoro alkylamine oxide, a fluorine-containing ORGANO siloxane system compound, etc. are mentioned. For example, Fluorad "FC-430", "FC-431" (all are the Sumitomo 3M make), Sir chlorofluocarbon "S-141", "S-

145" (all are the Asahi Glass Co., Ltd. make), A uni-dyne "DS-401", "DS-403", "DS-451" (all are the Daikin Industries, LTD. make), A megger fuck "F-8151" (product made from Dainippon Ink Industry), "X-70-092", and "X-70-093" (all are the Shin-Etsu Chemical Co., Ltd. make) are mentioned.

[0063] As an extinction nature ingredient, azo compounds, curcumin, etc., such as 2-benzene azo-4-methyl phenol and 4-hydroxy-4'-dimethylaminoazobenzene, are mentioned.

[0064] As an approach of forming a pattern using the above-mentioned resist ingredient, a resist ingredient is applied on a substrate according to a conventional method. In this case, although there is especially no limit in the class of substrate, this invention is effective in a NiFe film substrate. Moreover, it is preferably desirable [the resist thickness] 3-30 micrometers more preferably to be referred to as 3-10 micrometers still more preferably 3-50 micrometers 1-50 micrometers. Subsequently, preferably, although it exposes through a photo mask after heating for 1 - 10 minutes, in this invention, exposure uses 90-130 degrees C of ultraviolet rays with a wavelength of 300nm or more. although especially light exposure is not restricted, either -- 1 - 1,000 mJ/cm² -- it can consider as 10 - 500 mJ/cm² preferably. Then, if needed, 100-130 degrees C and heat-treatment for 1 - 5 minutes are performed preferably, and, subsequently negatives are developed using a developer. In this case, as a developer, inorganic system alkali water solutions, such as organic system alkali water solutions, such as tetramethylammonium hydroxide (TMAH), a sodium hydroxide and a potassium hydroxide, and a metaboric acid potassium, etc. can be used. Thus, a positive type pattern can be obtained. Then, magnetic materials, such as copper, gold, and Fe, nickel, Co, a pewter, etc. can be plated on a substrate.

[0065]

[Effect of the Invention] According to the resist ingredient of this invention, especially, by ultraviolet-rays exposure of 300nm or more, it is high resolution and high sensitivity and the pattern which was moreover excellent in plating-proof nature can be formed.

[0066]

[Example] Although a synthetic example, an example, and the example of a comparison are shown and this invention is explained concretely hereafter, this invention is not limited to the following example. In addition, in each example, each section is the weight section.

[0067] In 3 opening flask equipped with the synthetic agitator of [synthetic example 1 and 2] novolak resin, the capacitor, and the thermometer, 64.8g (0.60 mols) of p-cresol, m-cresol 162.3g (1.50 mols), 3,5-xylene 110.1g (0.90 mols), 0.90g (7.2xten - three mols) of oxalic acid 2 hydrates was taught 37% of the weight as 133.8g (1.65 mols) of formaldehyde water solutions, and a polycondensation catalyst, the flask was dipped in the oil bath, the internal temperature was held at 100 degrees C, and the polycondensation was performed for 1 hour.

[0068] After adding 1,500ml methyl isobutyl ketone (MIBK) after reaction termination and agitating for 30 minutes, the water layer was separated, the product extracted by the MIBK layer was rinsed 5 times with 900ml pure water, and after separating liquids, 4mmHg performed the 150-degree C reduced pressure strip in the evaporator. Consequently, 245g of novolak resin A-1 was obtained.

[0069] Moreover, as shown in Table 1, it compounded like novolak resin A-1 using raw material phenols and formaldehyde, and novolak resin A-2 was obtained.

[0070]

[Table 1]

合成例	ノボラック樹脂	p-クレゾール (モル%)	m-クレゾール (モル%)	3,5-キシレノール (モル%)	Mw
1	A-1	20	50	30	6,000
2	A-2	60	40	—	3,000

[0071] [Synthetic examples 3-5] Under synthetic protection from light of 1 and 2-naphthoquinonediazide sulfonyl group installation novolak resin, novolak resin A-1 (OH equivalent 124.4)150g (1.2 mols) and 1,2-naphthoquinone-2-diazido-5-sulfonyl chloride 19.3g (0.072 mols) and 1,4-dioxane 760g were taught into 3 opening flask equipped with the agitator, the dropping funnel, and the thermometer, and it dissolved. Triethylamine 8.0g (0.079 mols) was dropped at this solution at the room temperature. After dropping termination, after continuing churning for 10 hours, the resin which supplied to a lot of 0.12-N hydrochloric-acid water solutions, and deposited was collected. The collected resin was dissolved in 600g ethyl acetate, after washing 3 times and separating liquids with 200g water, the reduced pressure strip was performed at 40 degrees C, and 140g of 1,2-naphthoquinone-2-diazido-5-sulfonyl group installation novolak

resin C-1 shown in Table 2 was obtained.

[0072] Moreover, 1,2-naphthoquinone-2-diazido-5-sulfonyl group installation novolak resin C-2 and C-3 were obtained like the above using the raw material shown in Table 2.

[0073]

[Table 2]

合成例	NQD 基導入 ノボラック樹脂	ノボラック樹脂	NQD 基導入 (モル%)
3	C-1	A-1	6
4	C-2	A-1	15
5	C-3	A-2	10

* NQD radical: 1,2-naphthoquinone-2-diazido-5-sulfonyl group [0074] The base resin shown by the [example of example and comparison] following type (Polym-1-3), and the above A-1, 1 shown by the acid generator shown by the following formula (PAG-1), above-mentioned C-1-3, and the following formula (C-4-6), the compound which has 2-naphthoquinonediazide sulfonyl group in a molecule, The dissolution accelerator shown by the following formula (E-16, E-34), the basic compound (front Naka TEA shows triethanolamine) shown in Tables 3 and 4, Furthermore, after dissolving in the organic solvent which shows the surfactant Fluorad "FC-430" 0.1 section in Tables 3 and 4 and considering as a homogeneity solution, it filtered with the 0.2-micrometer membrane filter, and the resist solution was prepared.

[0075] The spin coat of the obtained resist solution was carried out on the NiFe permalloy substrate, software BEKU for 300 seconds was performed at 120 degrees C on the hot plate, and the resist film with a thickness of 6.0 micrometers was formed.

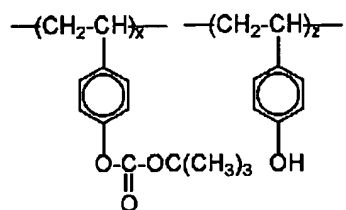
[0076] Next, after exposing using the stepper for i lines (NIKON CORP., NSR1755i7ANA=0.50) through the reticle and performing PEB for 120 seconds (after [exposure] BEKU) at 100 degrees C, 2.38% of the weight of the tetramethylammonium hydroxide water solution performed a pure-water rinse and desiccation after the development for 300 seconds, and the positive type pattern was obtained.

[0077] By making light exposure which 3.0-micrometer Rhine and a tooth space resolve by 1:1 among the obtained resist patterns into the optimal light exposure (sensibility: Eop), in this light exposure, there is no film decrease of the top section of a pattern, and minimum line width of Rhine which the bottom section has separated, and a tooth space was made into resolution. A resist ingredient presentation is shown in Tables 3 and 4, and the evaluation result of an example and the example of a comparison is shown in Tables 5 and 6.

[0078]

[Formula 22]

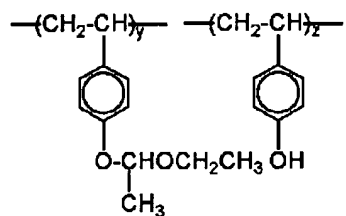
Polym-1



$$x/(x+z)=0.20$$

$$Mw=15,000$$

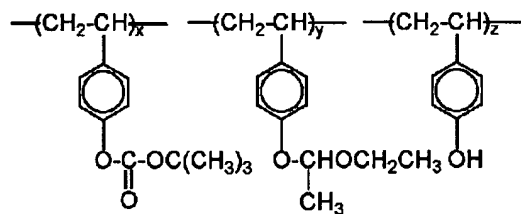
Polym-2



$$y/(y+z)=0.25$$

$$Mw=10,000$$

Polym-3



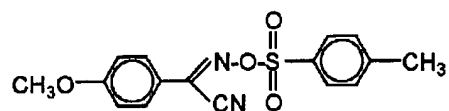
$$x/(x+y+z)=0.15$$

$$y/(x+y+z)=0.13$$

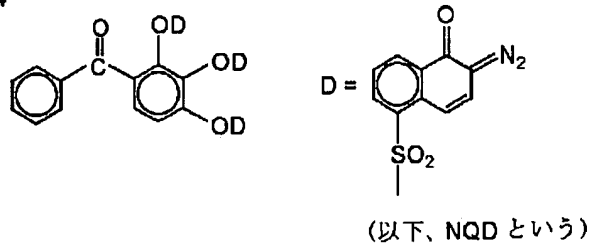
$$Mw=10,000$$

[0079]
[Formula 23]

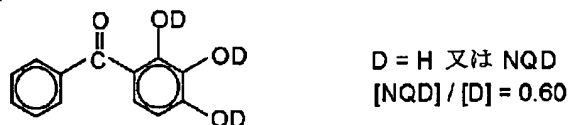
PAG-1



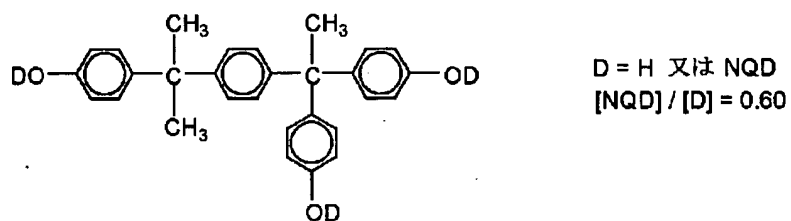
C-4



C-5



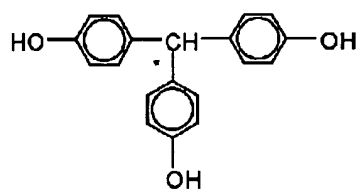
C-6



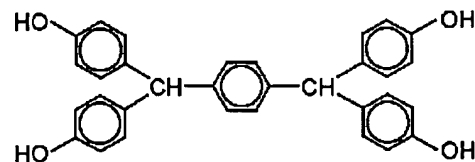
[0080]

[Formula 24]

E-16



E-34



[0081]

[Table 3]

実施例	ヘース樹脂	酸発生剤	感光剤	塩基性化合物	添加剤	有機溶剤
1	Polym-1 (80)	PAG-1 (2.0)	C-4 (1.0)	N-メチルピロリドン (0.20)	—	PGMEA (150)
2	Polym-1 (80)	PAG-1 (2.0)	C-5 (1.5)	TEA*** (0.15)	—	EL/BA** (150)
3	Polym-1 (80)	PAG-1 (2.0)	C-6 (2.0)	TEA (0.15)	E-34 (3.0)	PGMEA (150)
4	Polym-2 (80)	PAG-1 (2.0)	C-5 (2.0)	TEA (0.15)	—	PGMEA (150)
5	Polym-2 (80)	PAG-1 (2.0)	C-6 (1.5)	N-メチルピロリドン (0.15)	—	EL/BA (150)
6	Polym-2 (80)	PAG-1 (1.5)	C-2 (2.0)	TEA (0.15)	E-16 (3.0)	PGMEA (150)
7	Polym-2 (80)	PAG-1 (2.0)	C-1 (1.0) C-4 (1.0)	TEA (0.15)	—	PGMEA (150)
8	Polym-3 (80)	PAG-1 (2.0)	C-4 (2.0)	TEA (0.15)	—	PGMEA (150)
9	Polym-3 (80)	PAG-1 (2.0)	C-5 (2.0)	TEA (0.15)	E-16 (3.0)	PGMEA (150)
10	Polym-3 (80)	PAG-1 (2.0)	C-3 (3.0)	TEA (0.10)	—	EL/BA (150)

** EL/BA(ethyl lactate/butyl acetate) =85/15*** TEA: Triethanolamine [0082]

[Table 4]

比較例	ヘース樹脂	酸発生剤	感光剤	塩基性化合物	添加剤	有機溶剤
1	Polym-1 (80)	PAG-1 (2.0)	—	TEA (0.15)	—	PGMEA (150)
2	Polym-1 (80)	PAG-1 (2.0)	C-6 (2.0)	—	—	PGMEA (150)
3	A-1 (80)	—	C-5 (15.0)	—	—	EL/BA (150)

[0083]

[Table 5]

実施例	感度 E_{op} (mJ/cm ²)	解像度 (μ m)	プロフィール
1	40	1.0	矩形
2	90	1.0	矩形
3	84	1.0	矩形
4	95	1.0	矩形
5	42	1.0	矩形
6	90	1.0	矩形
7	88	1.0	矩形
8	90	1.0	矩形
9	86	1.0	矩形
10	96	1.0	矩形

[0084]

[Table 6]

比較例	感度 E_{sp} (mJ/cm ²)	解像度 (μ m)	プロファイル
1	25	1.0	湾曲状
2	25	1.0	湾曲状、T-トップ
3	650	1.5	順テーパ

[Translation done.]